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(54) Sliding panels

(57) Various improvements to sliding panels are disclosed. In a first aspect, an elongate bottom section 6 for a sliding panel is provided, the section having an upturned U-shaped cross-section so that roller assemblies can be placed within the section at any desired position. According to a second aspect, a cover plate (11 or 12, Fig 2) for a sliding panel is provided, the cover plate fitting over an otherwise exposed structural fitting of the panel so that with the panel closed, the cover plate cannot be readily removed, thus enhancing the security aspects for interalia sliding patio doors. A frame for patio doors is provided (Fig 5) for on-site assembly from reinforced top, middle and bottom channels, upper and lower glazing panels and vertical side channels. A further improvement which is directed to providing enhanced security, comprises an adjustable height blocking mechanism (18, Fig 3) for positioning within a top retaining channel of a sliding panel assembly, the arrangement being configurable into a first configuration to allow insertion of the sliding panel between top and bottom retaining channels and then reconfigurable into a second configuration so as to limit upward movement of the sliding panel when the panel is in a closed position.

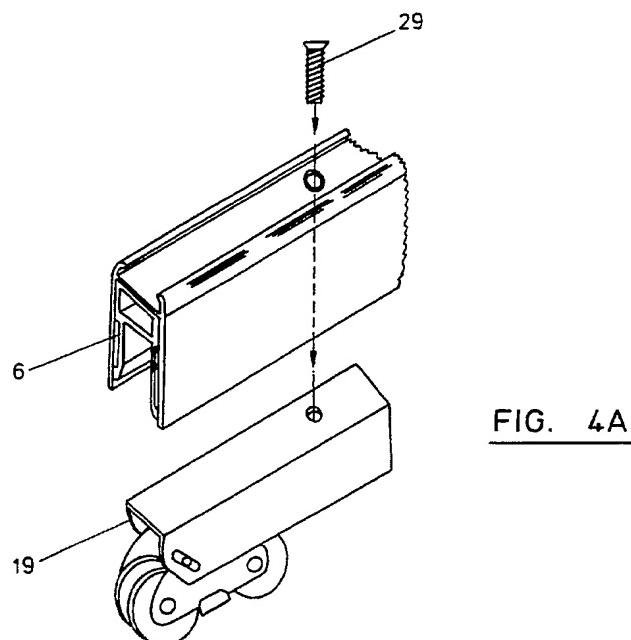


FIG. 4A

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

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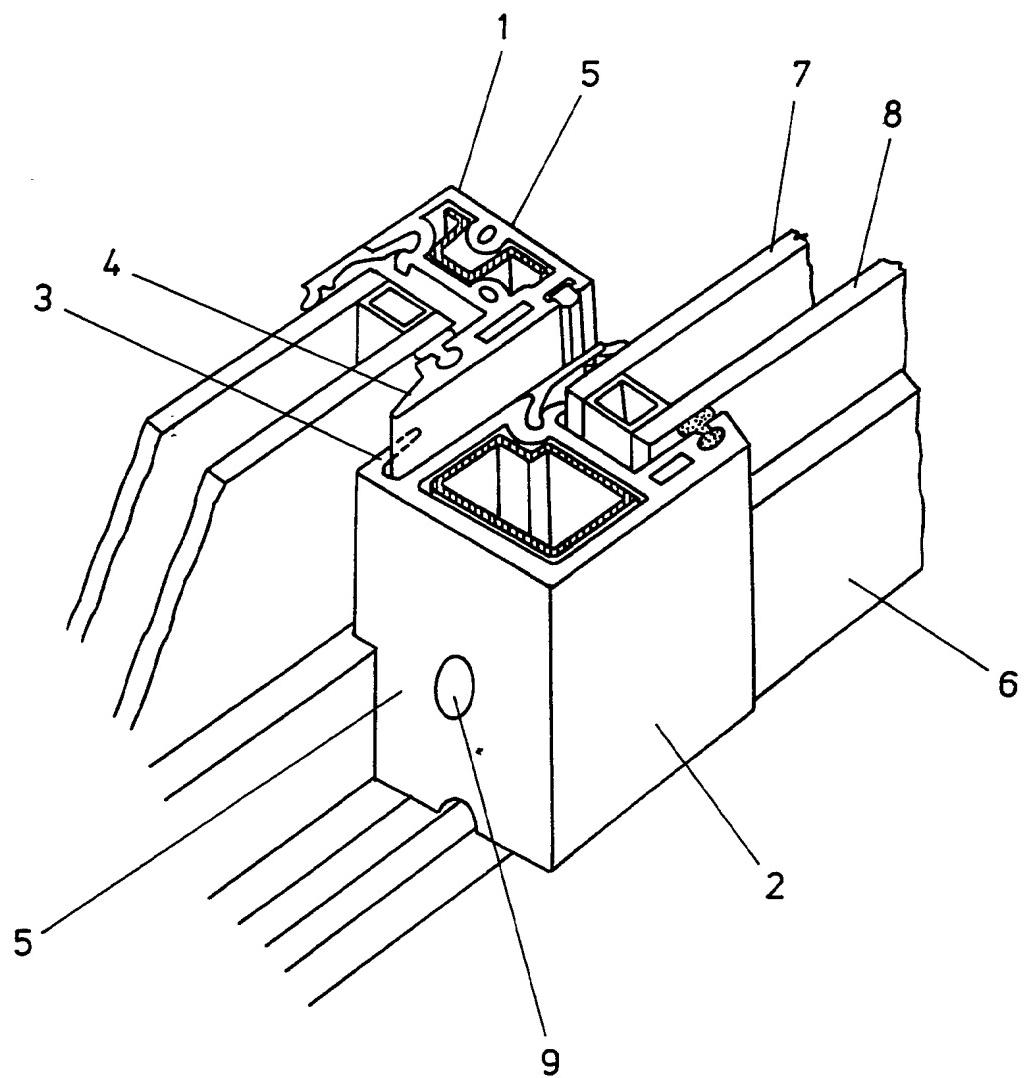


FIG. 1

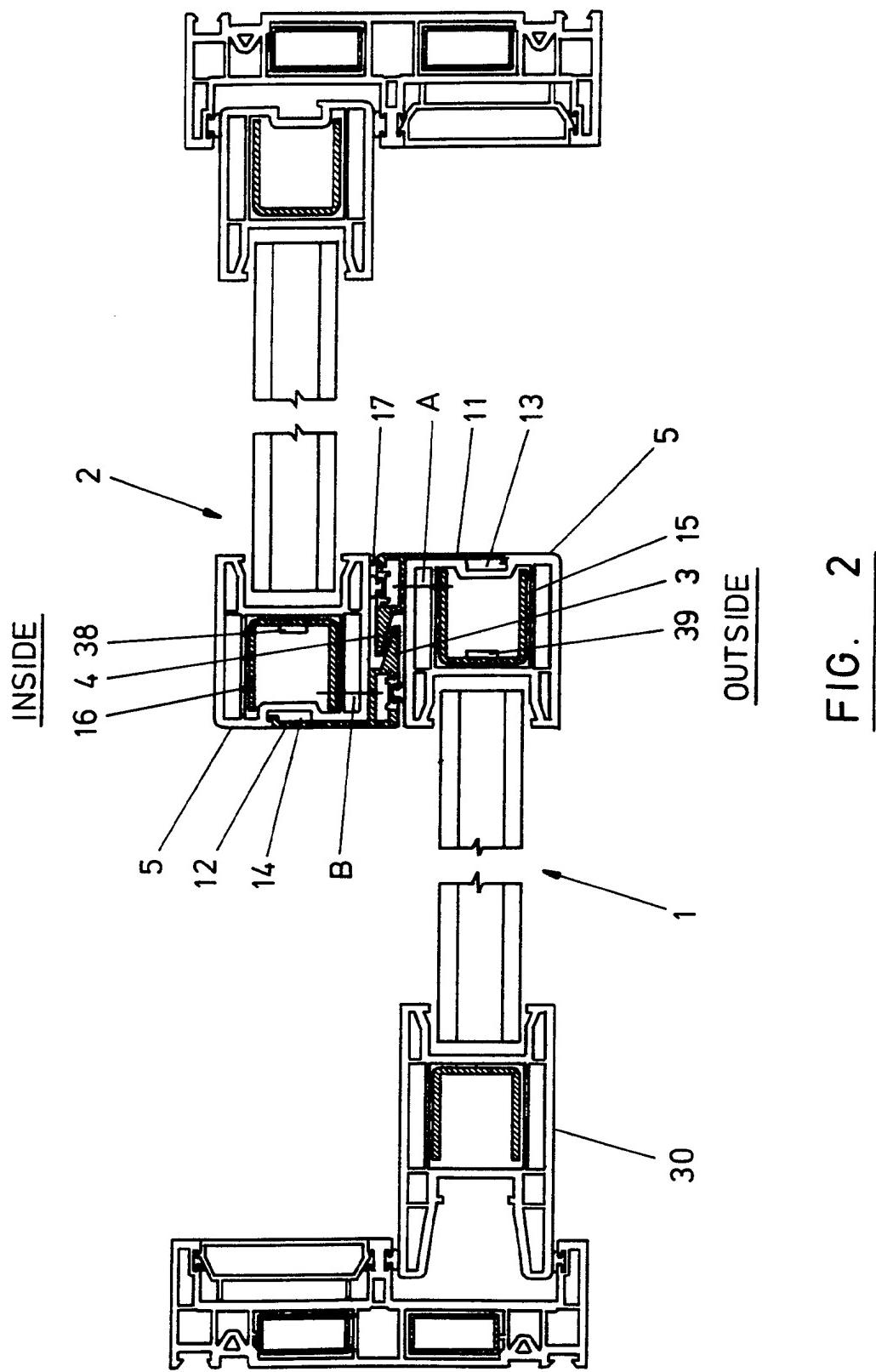


FIG. 2

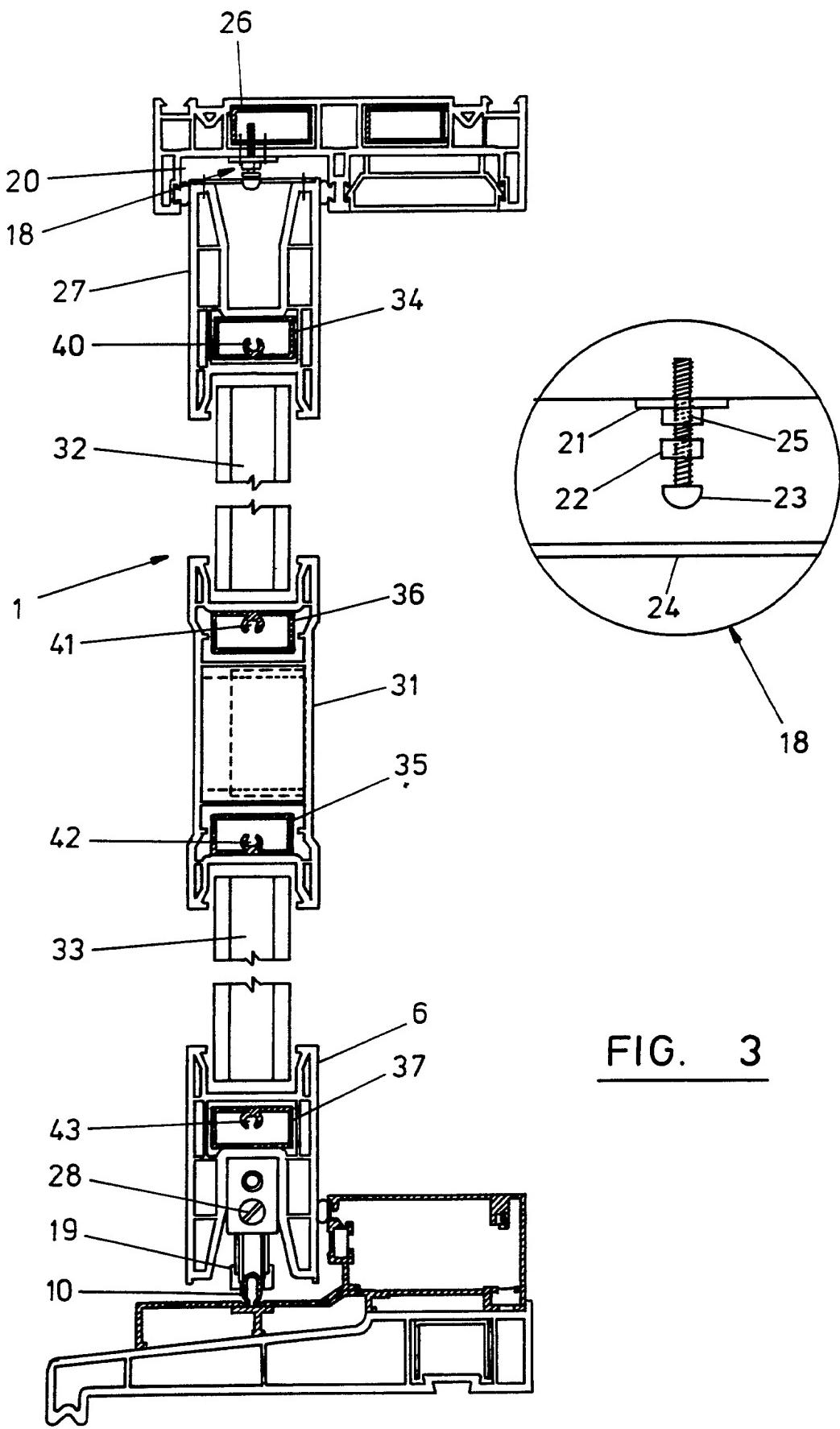


FIG. 3

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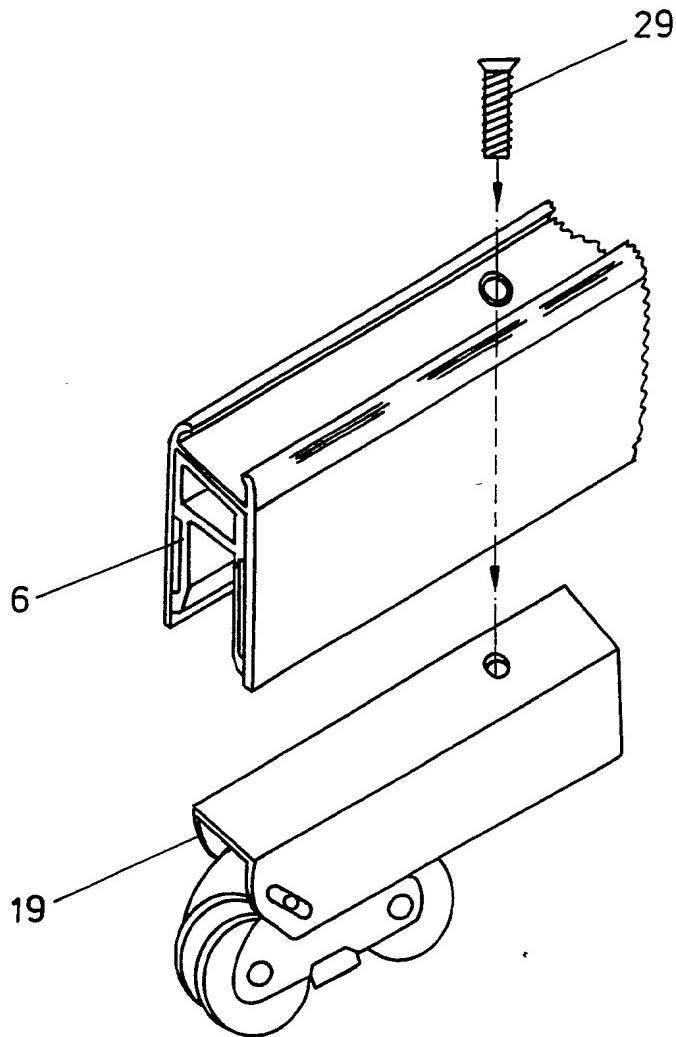
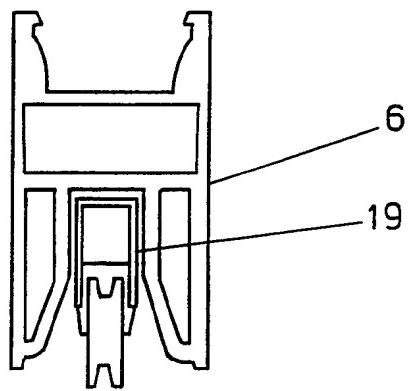


FIG. 4A

FIG. 4B



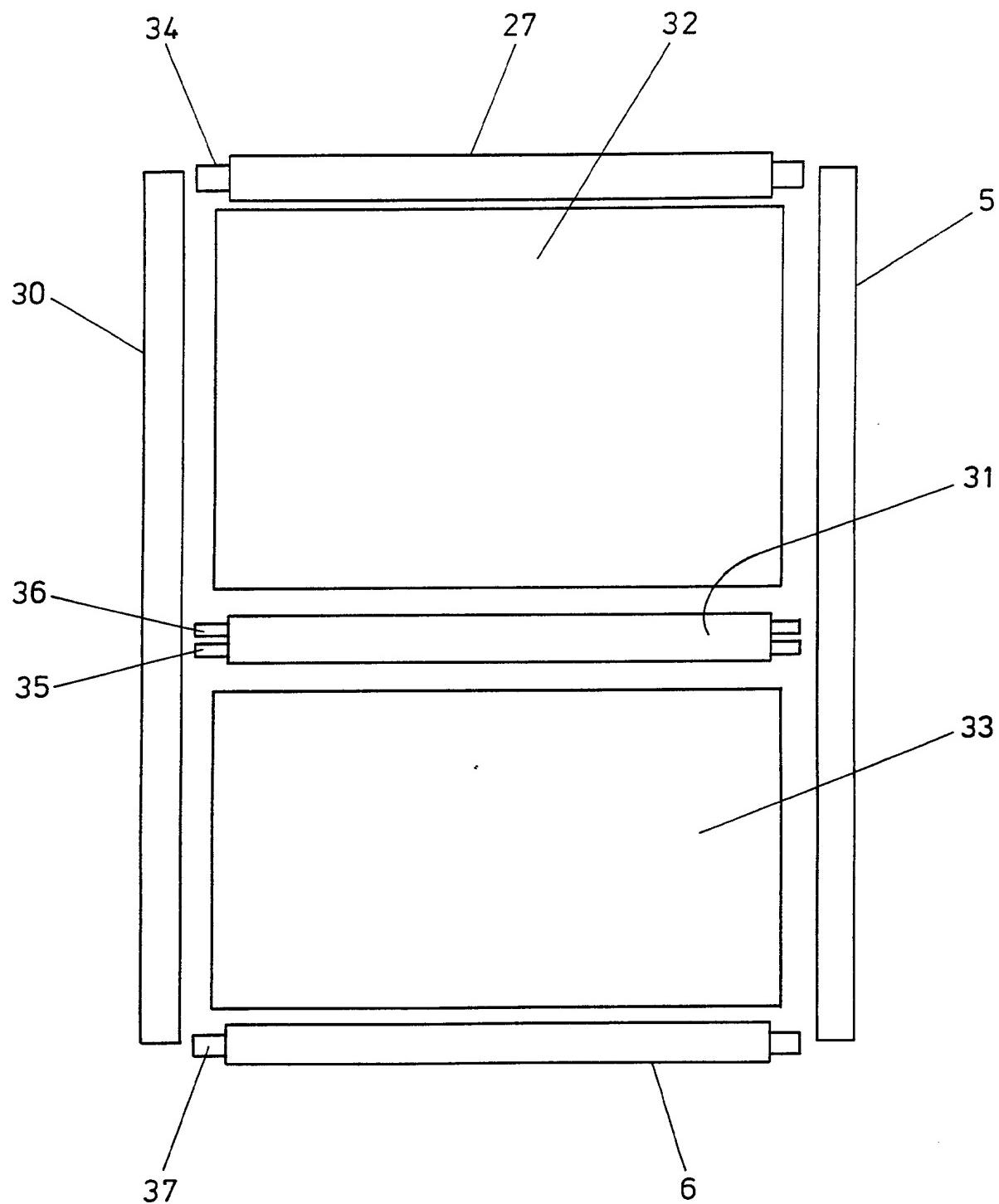


FIG. 5

- 1 -

SLIDING PANELS

The invention relates to sliding panels and particularly, but not exclusively to sliding panels for use with glazing systems, such as sliding patio doors.

Known sliding panels have security problems associated with them. A typical sliding panel arrangement shown in Figure 1 comprises a first movable panel 1 and a second fixed panel 2. When the panels are shut, the two panels interlock as shown in the Figure by means of overlapping lips 3 and 4. The interlocking of the two panels helps to bring them together to close the gaps between them and form a seal.

Whilst bringing the panels together in this fashion does provide some security (by hindering the insertion of a lever between the two panels) it is still possible for an intruder to gain entry by dismantling part of the frame structure.

The panels are constructed by securing, vertical 5 and horizontal 6, extruded channels together around glass units 7, 8. The joints are simple butt joints formed between the horizontal and vertical members and secured by screws which are only covered by easily removable decorative caps 9. It is a simple matter for an intruder who is familiar with the form of construction to remove the caps 9, undo the upper and lower screws of the outside panel 1 and dismantle the frame to gain entry.

A first aspect of the invention provides a cover plate for a sliding panel, wherein the cover plate fits over an otherwise exposed structural fitting

of the panel, and is fitted to the panel in such a manner that with the panel closed the cover plate cannot be readily removed.

- Preferably, two cover plates are provided, one each for a pair of co-
5 operating panels. Preferably, the panels have interlocking portions. The cover plates preferably form the interlocking portions.

- Door panels, and frames in general, which are formed by abutting horizontal and vertical members around one or more central panel members
10 present certain constructional difficulties.

Normally, each horizontal and vertical member comprises an extruded plastics channel which covers an internal reinforcing section. The plastics channel covers the reinforcing section like a sleeve.

- 15 Usually on site, the members are cut to their desired lengths and the frame assembled. Conventionally, prior to assembly, the internal reinforcing sections are cut to the same size as their plastics sleeve, top and bottom horizontal members positioned above and below the central panel or panels,
20 vertical side members pushed onto the half assembled frame and then secured by screws.

- This assembly operation has the drawback in that, when the side members are being pushed onto the central panel or panels, the half assembled
25 frame is by no means rigid. Furthermore, difficulty is often experienced in locating the vertical side members onto the central panel or panels and bringing them into abutment against the horizontal members.

A second aspect of the invention provides a method of assembling a frame, the method comprising:

- cutting first and second panel-retaining channels to a first length;
- 5 cutting internal reinforcing members for the first and second channels to a second length, longer than the first length;
- 10 inserting the reinforcing members into the first and second channels, such that a portion of each reinforcing member protrudes from each end of its respective channel;
- placing the first and second channels on opposing edges of a panel; and
- 15 completing the frame by pushing third and fourth retaining channels onto the remaining two opposing edges of the panel, wherein the protruding portions of the reinforcing members act as a guide for the location of the third and fourth channels, thereby aiding assembly.
- 20 A further problem associated with the on-site assembly of sliding panels concerns the roller assembly. The rollers enable the panel units to slide along a guide track below the panel. It is desirable to position a first roller assembly at one end of the bottom edge of the sliding panel and a second unit at the other end. Positioning rollers in this manner reduces the risk that
- 25 opening the sliding panel will cause the panel to tilt rather than slide.

Conventional sliding panels have a closed section bottom edge with fixed position apertures for locating roller assemblies. These apertures are

milled or cut into a bottom rail of the sliding panel. An on-site assembler would determine what length of section is required for a given location and then cut the section accordingly. If the required length happens to enable the roller assemblies to be positioned approximately at the end regions of the 5 section then there is no problem. However, it is likely that the positioning arrived at will be less than ideal.

A third aspect of the invention provides an elongate bottom section for a sliding panel, wherein the section is an up-turned U-shaped cross-section 10 such that roller assemblies can be positioned at any desired position along the section. This preserves the strength of the bottom section and greatly reduces the amount of preparation required on the bottom section.

A still further drawback of conventional sliding door panels concerns 15 the fact that in order for a panel to be positioned onto the guide track during assembly, there must necessarily be enough room above the top edge of the panel to enable the bottom rollers to be lifted over, and on to, the guide track. This means that removal of the panel can similarly be effected by raising the bottom section of the panel and levering it off the track. This operation could 20 be performed by an intruder.

To counter this security problem, it is common practice to position 25 blocks inside a top retaining channel above the sliding panel during assembly. Such blocks limit the amount by which the panel can be lifted. There are normally two panels, each one extending approximately half way across a given opening. Often only one of the panels is movable, and this movable panel slides along the track which extends across the full width of the opening. Because of this, blocks need only be positioned in the area of the

top retaining channel of the sliding door corresponding to a "closed", or locked position of the unit.

In practice, adjustment of the roller assembly height at each end of the
5 bottom section is often required to provide smooth running of the panels. Such adjustment means that one end of the top edge may be higher than the other end. Consequently, to be effective the blocks within the top retaining channel must be of such a size that they do not interfere with the smooth running of the sliding panel when the roller assemblies are at their maximum
10 height adjustment positions. Inevitably, there will be a security compromise in such situations.

The fourth aspect of the invention provides an adjustable height security mechanism for positioning within a static top retaining channel of a sliding
15 panel assembly, the security mechanism being adapted to limit upward movement of the sliding panel when the panel is in a closed position. Providing an adjustable height security mechanism enables the gap above the sliding panel to be minimised.

20 By way of example, specific embodiments of the invention will now be described, with reference to the accompanying drawings, in which:

Figure 2 is a horizontal sectional view of a pair of co-operating door panels;

25 Figure 3 is a vertical sectional view showing one of two door panels of Figure 2;

Figures 4A and 4B are perspective and end views respectively of a bottom section of a door panel showing positioning of a roller assembly; and

Figure 5 is a schematic view of a door panel.

5

Referring initially to Figures 2 and 3 in which components common to Figure 1 are shown by like numerals, a pair of door panels 1 and 2 are shown.

10 Door panel 1 is a movable outside door which moves on a track 10 in a direction parallel to fixed door panel 2. A pair of co-operating cover plates 11, 12 are provided, one mounted on the movable door 1 and the other on the fixed door 2. The cover plates, which are made of metal, provide extra security to the door by covering up recessed portions 13 and 14 and stiffening 15 the exposed vertical extruded channels 5.

20 Recessed portions 13 and 14 have access holes (not shown) through which screws may be passed for fixing vertical reinforcement sections 15, 16 to horizontal reinforcement sections 34, 35, 36 (shown in Figure 3). The screws - the heads 38, 39 of two of which are shown in Figure 2 - locate within the horizontal sections 34, 35, 36 in screw ports 40 - 43, so as to hold the structure together. If the screws are removed disassembly of the doors is facilitated. Covering the channels with plates 11, 12 renders these screws inaccessible.

25

The cover plates are fixed to the extruded channel by means of further screws (not shown) which pass through regions "A" and "B" and into internal reinforcement sections 15, 16. These regions "A" and "B" are completely

inaccessible when the doors are in the closed position shown in Figure 2. The cover plates 11, 12 would normally be attached to the doors 1, 2 prior to mounting them on their tracks 10.

5 The cover plates, in addition to covering the structural screws and providing extra reinforcing for the extruded channels 5, also form the interlocking lips 3 and 4. The lips of the embodiment of Figure 2, being made of metal, are stronger than the extruded plastics lips of Figure 1 and therefore provide an extra degree of security by giving greater resistance
10 against leverage caused by implements which might be inserted into a sealing region 17 by an intruder attempting forced entry.

Referring now in particular to Figure 3, a security mechanism 18 for limiting upward travel of a sliding door panel 1 will now be described.

15 The sliding panel 1, as described earlier, runs along a track 10 by means of rollers 19. The rollers are profiled to sit over the track 10. A top extruded portion of the panel 1 sits within a retaining channel 20.

20 The security mechanism 18 comprises a mounting portion 21, a lock-nut 22, a bolt 23 and a plate 24. The mounting portion 21 is fixed within the retaining channel 20 and has an internally threaded region 25 for co-operating with the bolt 23. The plate 24 has a hole formed in it so that the bolt 23 can pass through it. Lock-nut 22 enables the plate to be pinched between the nut
25 22 and bolt 23. The retaining channel 20 and a reinforcing member 25 are provided with apertures to allow through passage of the bolt 23.

The door panel 1, is fitted between top retaining channel 20 and track 10 by tilting the door panel to insert its top extruded portion 27 into the retaining channel 20. Thereafter the base of the door panel 1 is lifted to bring the rollers 19 over the track 10. Once the door panel 1 is positioned between 5 the retaining channel 20 and the track 10 the height of the door panel above the rollers 19 at each end of the door panel 1 can be adjusted by adjustment screws 28. Such adjustment enables minor height correction to be made to provide smooth running of the door upon the track.

10 Once the door runs smoothly, the security mechanism 18 can be adjusted such that the plate 24 may be moved downwardly to just clear the top extruded region 27. A plurality of security mechanisms 18 are provided, distributed at intervals across the channel 20 each, being individually adjustable to an optimum position. They need only be provided in the region 15 of the channel 20 in which the panel 1 will be located when the door is closed.

It should be noted that in order to better describe the operation of the rollers, security mechanism 18 and height adjustment, the cross-sectional view 20 of Figure 3 does not show the vertical channel 5 or the cover plate 11 of Figure 2. In fact, the end of the panel 1 onto which the vertical channel 5 if fitted is completely covered by the cover plate 11. The adjustment screw 28 would normally be accessible via access holes formed in the channel 5 and cover plate 11. Alternatively, the end of the channel 5 may be completely 25 obscured by the cover plate 11, in which case the roller height could be adjusted for smooth running during a trial fitting and then removed for fitment of the cover plate 11 which would then render the assembly tamper-proof.

Figure 4 shows the means by which roller assemblies may be attached to the bottom horizontal channel 6, at any desired location.

Because the channel 6 is of an upturned U-shaped section, as opposed
5 to a box section, there is no need to pre-form slots at intervals along the channel. It is therefore possible to simply cut the channel to its desired length and thereafter insert a roller assembly 19 into an optimum position within the open channel 6, i.e. adjacent to each end. The assemblies 19 may be secured in position by means of screws 29.

10

Referring now to Figure 5, which is a simplified exploded view of door panel 1, the method of assembly of a door frame will now be explained.

Figure 5 shows vertical side channels 5, 30, top and bottom horizontal
15 channels 27, 6, a horizontal middle channel 31 and glazing panels 32, 33. The top, bottom and middle channels each have a central, metal reinforcing section, or sections 34, 35, 36, 37 which extends through and is longer than its respective channel. In this manner, each channel 27, 31, 6 forms a sleeve covering at least one reinforcing section. Figures 2 and 3 show the cross
20 sections of the various vertical and horizontal channels and reinforcing sections.

As shown in Figure 5, the horizontal channels 27, 31, 6 and sections
34, 35, 36 and 37 are cut to different lengths. This cutting operation would
25 normally be performed on site.

The horizontal channels are cut to an appropriate length, such that with glazing panels 32 and 33 gripped between them, the vertical channels 5, 30

- can be pushed onto the sides of the glazing panels and butt joints formed between the horizontal and vertical channels by means of screws, without there being any significant gap between the joints and with the glazing panels held firmly. The reinforcing sections 34, 35, 36, 37 are cut to a longer length than their respective channels and are arranged to be approximately flush with the lateral edges of the glazing panels. Extending the reinforcement in this way aids the location of the vertical channels and the glazing panels and guides them into abutment with the horizontal channels.
- 5
- 10 The screws (not shown) pass through the uprights and into screw ports 40 - 43 provided in the horizontal reinforcement sections (as described earlier in relation to in Figure 3).
- 15 The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.
- 20 All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.
- 25 Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly

stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

5 The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

CLAIMS

1. An elongate bottom section for a sliding panel, wherein the section is an upturned U-shaped cross-section such that roller assemblies can be positioned at any desired position along the section.
5
2. A section according to claim 1, wherein the section is of indeterminate length and may be cut to a desired length at an assembly site.
- 10 3. A section according to claim 2, wherein the desired length corresponds substantially to a width of the sliding panel.
4. A section according to any of the preceding claims, wherein a pair of roller assemblies are provided, the roller assemblies being positioned within
15 the section at locations adjacent to end regions of the section.
5. A section substantially as herein-described, with reference to the accompanying diagrammatic drawings.
- 20 6. A cover plate for a sliding panel, wherein the cover plate fits over an otherwise exposed structural fitting of the panel, and is fitted to the panel in such a manner that with the panel closed the cover plate cannot be readily removed.
- 25 7. A cover plate in accordance with claim 6, wherein a pair of the panels are provided and each such panel is adapted for cooperation with a corresponding cover plate.

8. A cover plate according to claim 7, wherein the panels have interlocking portions.

9. A cover plate according to claim 8, wherein the interlocking portions
5 are formed by said cover plates.

10. A cover plate substantially as herein described with reference to the accompanying diagrammatic drawings.

10 11. A method of assembling a frame, the method comprising:

cutting first and second panel-retaining channels to a first length;

15 cutting internal reinforcing members for the first and second channels to a second length, longer than the first length;

inserting the reinforcing members into the first and second channels, such that a portion of each reinforcing member protrudes from each end of its respective channel;

20

placing the first and second channels on opposing edges of a panel; and

25 completing the frame by pushing third and fourth retaining channels onto the remaining two opposing edges of the panel, wherein the protruding portions of the reinforcing members act as a guide for the location of the third and fourth channels, thereby aiding assembly.

12. A method of assembling a frame, the method being substantially as herein described, with reference to the accompanying diagrammatic drawings.
- 5 13. An adjustable height security mechanism for positioning within a static top retaining channel of a sliding panel assembly, the security mechanism being adapted to limit upward movement of the sliding panel when the panel is in a closed position.
- 10 14. A security mechanism according to claim 13, comprising a blocking member connected to the top retaining channel, the blocking member being height adjustable.
- 15 15. A security mechanism according to claim 14, wherein the blocking member is placed in a first configuration to enable insertion of the sliding panel between top and bottom retaining channels and thereafter placed into a second configuration so as to limit the upward movement of the sliding panel, changing from the first configuration to the second configuration being brought about by adjusting the height of the blocking member.
- 20 16. A mechanism according to any of claims 13 to 15, wherein a plurality of blocking members are connected to the top retaining channel.
- 25 17. A security mechanism according to claim 16, wherein said plurality of blocking members are provided solely in a region of the top retaining channel which corresponds to a closed position of the sliding panel.
18. Adjustable height security mechanism substantially as herein described with reference to the accompanying diagrammatic drawings.

Relevant Technical Fields

- (i) UK Cl (Ed.M) E1J (JEB)
 (ii) Int Cl (Ed.5) E06B 3/46; E05D 15/06, 15/08

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii)

Search Examiner
MR J FULCHER

Date of completion of Search
8 SEPTEMBER 1994

Documents considered relevant following a search in respect of Claims :-
1 TO 5

Categories of documents

- | | | | |
|-----------|---------------------------------------------------------------------------------------------------------------|---------------|-------------------------------------------------------------------------------------------------------------------------|
| X: | Document indicating lack of novelty or of inventive step. | P: | Document published on or after the declared priority date but before the filing date of the present application. |
| Y: | Document indicating lack of inventive step if combined with one or more other documents of the same category. | E: | Patent document published on or after, but with priority date earlier than, the filing date of the present application. |
| A: | Document indicating technological background and/or state of the art. | &: | Member of the same patent family; corresponding document. |

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 1545470	(SCHLEGEL) see Figure 2	1 to 5
X	GB 1509438	(YOSHIDA) see Figures 1 and 4	1 to 5
X	GB 1479650	(YOSHIDA) see Figures 1 to 3	1 to 5
X	GB 1165523	(SWISS ALUMINIUM) see Figure 1	1 to 5
X	GB 337717	(ZIEHL) see Figure 1	1 to 5
X	US 4956952	(BANCROFT) see Figures 1 and 5	1 to 5

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).